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Natural Radiation Hazards in Maine Drinking Water

Naturally occurring radionuclides present a risk in Maine's drinking water that should be evaluated. Not long ago, a home in Waldoboro was found with 3,000 pCi/l Uranium and 56 pCi/l Radium in its well. This radiation exposure was treated by a water treatment company, who installed ion exchange units to remove the radionuclides. The ion exchange units for both the Radium and Uranium removal equipment backflush periodically to allow the systems to continue operating. The Uranium and Radium salts backflushed from the water treatment equipment get dumped into the residential septic system.

This well has an unusually high concentration of radionuclides, but employs a typical treatment method for removal of Uranium and Radium. For decades any residence with high concentrations of Uranium (usually the most common radionuclide in Maine waters after Radon) has been treated with an ion exchange system that dumps backflushed salts into the homes septic system. There is some concern that this may not be the safest manner to protect the general public from high concentrations of Uranium in the drinking water.

This issue has been given more urgency due to the recent revisions to the Federal Drinking Water Radionuclide Rule. This Rule, in existence for decades, has been revised to include Uranium. The revised Rule has set 30 pCi/l as a Maximum Contaminant Level (MCL) for Uranium in public drinking water supplies. The standard for Radium, 5 pCi/l, has been in place for over 20 years. With the inclusion of Uranium as a Federally regulated drinking water contaminant, not only will more homeowners be looking and treating for this contaminant, but many public water supplies will be dealing with it as well. It will only be a matter of time before concerns over disposal of Uranium from water treatment makes front page news. This was demonstrated last summer when seasonal residents in Stonington tried to shut down that towns water system in order to stop the Utility from dumping uranium salts into the ocean.

While by-products of treatment at public water supplies will soon be addressed through revisions to Maine radiation regulations, there is still little guidance available for homeowners with Uranium or radium concerns in their well water. This is an issue that Maine's radiation protection community may want to investigate.

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Advisory Commission On Radioactive Waste & Decommissioning NEWS

INSIDE THIS ISSUE:

Special points of interest:

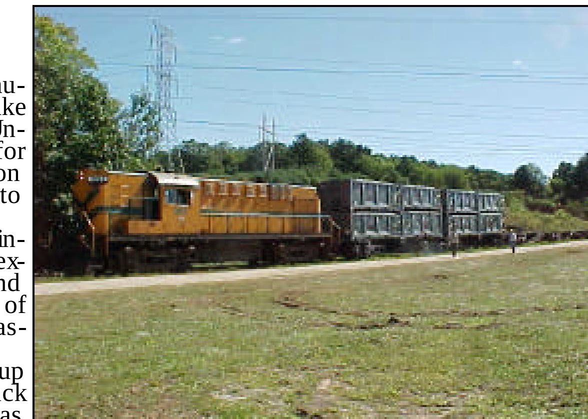
- Low Level Radioactive Waste and Materials in Maine
- Decommissioning of Maine Yankee Atomic Power Plant
- Radioactive Waste Management
- High Level Radioactive Waste

NEXT MEETING OF THE ACORWD is on 2 April 2001.

It will be held in the Utilities Room at the State Office Bldg in Augusta, Maine. The public is more than welcome to attend.

The time is from 2-5 p.m.

Low Level Radioactive Waste Train Cars in Brunswick, Maine



Railroad containers holding low-level nuclear waste from Maine Yankee make stops in Brunswick en route to Utah. Until recently the railcars sat in a siding for day or two until Guilford Transportation could hook them up to move them to South Portland.

The cars are just a sampling of the increased number of radioactive freight expected to pass through Brunswick and Southern Maine as decommissioning of the former nuclear power plant in Wiscasset progresses,

Earlier in the year interest sparked up when a shipment of cars sat in Brunswick longer than anticipated. The delay was caused when Guilford could not make the scheduled hook up. Local newspapers were on the story and interviewed local officials.

Brunswick's fire chief said caution needs to be exercised in dealing with such material, but noted his department and others are prepared to respond in the event of an emergency.

The six gray sea-land containers were at a staging area operated by Guilford Transportation on the tracks parallel to Pleasant Street between Stanwood Street and Church Road. Maine Yankee uses Safe Handling Rail Inc. of Auburn to haul its waste to the Brunswick staging area, where Guilford takes over.

The containers are labeled "MHF Logistical Industries," a company in Zelienople, Pa., that makes the intermodal containers and are used in handling the transfer of nuclear waste for Maine Yankee.

The containers hold concrete rubble with trace amounts of radiation. Approximately two such containers a month are going through Brunswick.

The radiation and very low on the shipments, but are still detectable. Maine Yankee states that the amounts of radiation in these particular rubble shipments pose no threat to people. However, as the decommissioning progresses over the next two years, material with higher amounts of radiation will be coming through Brunswick at an increasing rate. Those cars will be labeled with a radiological warning placard and they will not be kept at any staging area for an extended period of time. If these cars had been placarded, they would not have sat in Brunswick, an engine from Guilford waiting to take them as soon as they arrived.

The material from Maine Yankee is being taken by rail, road and ocean-going barge. The transportation of the material is regulated by the U.S. Department of Transportation and the Nuclear Regulatory Commission. Maine Yankee is required to notify the Maine Bureau of Health's Division of Health Engineering about all waste shipments. That division's Radiation Control Program also inspects a number of these shipments for compliance to regulations.

The rubble on these trains is headed to Envirocare in Clive, Utah. All of the contaminated waste from the decommissioning will be headed either to Utah or a facility in Barnwell, S.C. About 90 percent of it will be "Class A," or low-level waste.

Brunswick's Fire Chief is aware that radioactive waste is coming through Brunswick. The fire department is not notified every time it happens, which is not unusual, due to the number of shipments passing through the city. In addition to the nuclear power plant, radioactive material routinely is shipped to and from hospitals and other facilities. The Brunswick Fire Department , like many others, is trained to deal with accidents involving nuclear and other hazardous materials, and they have radiation monitors to use in the event of an emergency.

A long list of dangerous substances, including chemicals for paper companies, flammable liquid and explosives, moves every day on rail lines and highways.

Maine Yankee's new policy is not to ship railcars out until Guilford can guarantee they will be moved to South Portland's rail-yard the same day.

All meetings of the Advisory Commission are open to the public. The commission meets 4-6 times a year to discuss LLW and decommissioning issues. Meeting dates can be found at our website or call Tom Hillman at 207-287-8401 for the next meeting time or to be placed on the meeting notification list.

Why Has Science Failed to Find a Nuclear Waste Disposal Site?

Science has spent a long time trying to do the "right thing" technologically so that the nation has radioactive waste disposal site. The types of waste are high, low and transuranic. If a site meets the criteria set by science, then a site can be established. How wrong that simple logic has become.

Several candidate sites have survived severe technical scrutiny since the LLRW Policy Act of 1980 and only one site has opened since that date.

In the high-level waste arena, congress selected Yucca Mountain in Nevada. Yet it is behind schedule and over budget. Until it opens nuclear plants will have to store its fuel onsite. In the end it may never open.

The Waste Isolation Pilot Plant in New Mexico is the only site to have begun receiving waste. That waste is transuranic and only from the Departments of Defense and Energy.

Geologic terms are often cited as the problem, however the real stopping power has not been technical. This power is public acceptance, politics and special interest groups.

Science will always have a problem achieving a credible and reasonable balance in the interplay of technical, social and political forces in decisions that involve public interest.

In many states the waste is piling up. It would be far safer in a disposal site than hospital, college and industrial storage facilities. When Barnwell closes it will become a larger problem.

Science has failed to fully incorporate social and political parts of the decision process. As long as the technical, political and social aspects are at odds a site will never be approved.

Radioactive waste is apart of our industrial society.

What Is Storage?

The International Atomic Energy Agency defines **storage** as:

> *The placement of waste in a nuclear facility where isolation, environmental protection and human control are provided with the intent that the waste will be retrieved at a later time.*

The primary distinction between "storage" and "disposal" is the phrase *"with the intent that the waste will be retrieved at a later time"*. If waste retrieval is not intended, then it is "disposal"?

Radioactive wastes are typically stored for one or more of the following reasons: to allow them to decay to lower radioactivity levels; to temporarily hold them awaiting processing (or until a processing method has been developed); or to temporarily hold them awaiting disposal (or until a disposal facility has been constructed). Each of these reasons may impose slightly different restrictions on storage in terms of length of time, physical form of the waste, radioactivity levels, etc.

"Storage for decay" is a cost effective way to manage short lived, low level radioactive wastes. Due to the physical laws of nature, the radioactivity reduces with time. After 10 half-lives the level of radioactivity has reduced by a factor of 1024, typically to near background levels. For the short lived radioisotopes typically used in medicine and research, this storage period for complete decay may be only a few weeks to a few months. After this time, the waste is no longer radioactive and can be disposed of as conventional waste (of course, taking into account any other hazards that the waste might pose, such as biological hazards). Many medical facilities in Maine do this. For other wastes, such as spent nuclear fuel, the "storage for decay" period may be many hundreds of thousands of years. However, it is important to note that all radioactivity will eventually decay.

Spent Fuel Dry Storage

The Nuclear Assurance Corporation (NAC) says one third of spent fuel (SF) could be in dry storage by 2010

The amount of spent fuel in dry storage is increasing rapidly and could make up more than one third of the entire U.S. commercial spent fuel inventory within 10 years, according to NAC Worldwide Consulting's latest survey of dry storage use.

The amount of spent fuel in dry storage in the United States increased almost 30 percent in 2000 compared to the previous year, according to U.S. Spent Fuel Update: Year 2000 in Review.

U.S. utilities added approximately 540 metric tons of U.S. commercial fuel to dry storage installations over the past year, bringing total inventories to 2,430 metric tons.

Less than 6 percent of the U.S. spent fuel inventory is now in dry storage, but NAC expects this to increase to almost one-third by 2010.

NAC attributes the projected increase to fuel pools (wet storage) reaching capacity, decommissioning requirements and availability of licensed new-generation dry storage systems.

The Nuclear Regulatory Commission (NRC) licensed four new spent fuel management technology systems in 2000.

Three new dry storage facilities began operations in 2000: Dresden, Hatch and Peach Bottom. Rancho Seco received a site-specific license for a dry storage facility.

Seventeen independent spent fuel storage installations (ISFSIs) are licensed in the United States, with 15 storing spent fuel.

During 2000, utilities deployed a record 49 canisters or cask systems, bringing the total number of such systems deployed at U.S. plants to 233.

NAC predicts an additional 107 dry spent fuel systems will be loaded in 2001.

NAC points out that approximately 1,120 metric tons of spent fuel have been placed in dry storage since Jan. 31, 1998, the original date for DOE to accept spent fuel under the Nuclear Waste Policy Act of 1982 as amended.

The year 2000 also was distinguished by a "flurry of congressional, DOE and utility actions," including legislation to expedite federal spent fuel acceptance, ultimately vetoed by President Clinton, and a "spate of utility legislation."

NAC also noted that eight utilities sued DOE on Nov, 22, 2000, challenging DOE's use of the Nuclear Waste Fund to pay damages in the agreement the department made with PECO Energy. The companies contend that the use of funds violates the Nuclear Waste Policy Act.

Maine Yankee plans to store its SF in a ISFSI using the NAC Universal MPC System in a facility now being built, until that future retrieval date arrives.

Transportable Storage Container:
length=175-192 inches
diameter=67 inches
weight empty=19 tons
Weight loaded=38 tons

Transport container:
Length=209 inches
Diameter=92 inches
Weight empty= 83 tons

Vertical Concrete Storage Container:
Length-211-236 inches
Diameter=136 inches
Weight empty=121 tons
Weight loaded=160 tons